Small Business Innovation Research/Small Business Tech Transfer

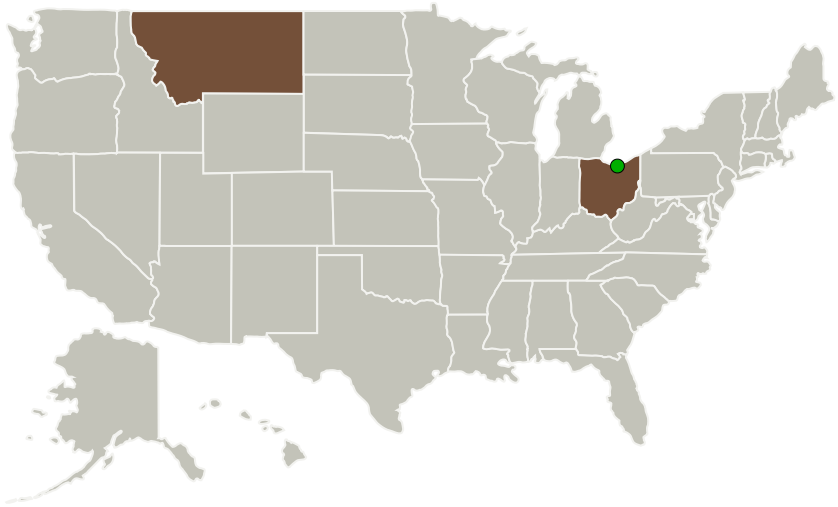
High Fidelity Down-Conversion Source for Secure Communications using On-Demand Single Photons, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

To provide reliably secure communications, development of quantum optical devices for encrypted ground-to-space communications is a necessity. The overall goal of this NASA effort is to develop and deliver efficient, single-pass quantum optical waveguide sources capable of backward quasi-phase-matched interactions for generation of high purity photon pairs for use in an on-demand photon source to enable high-rate long-distance encryption key distribution. The new devices will produce down-conversion entangled photon pairs with enhanced spectral properties and low attenuation, providing the key technology required for development of an on-demand heralded photon source. Furthermore, the waveguide-based technology is compact, robust, and power efficient for future deployment on space-based platforms to provide provably, unconditionally secure quantum encryption to satisfy requirements for the NASA topic Transformational Communications Technology.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ADVR, Inc.	Lead Organization	Industry	Bozeman, Montana
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

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Primary U.S. Work Locations	
Montana	Ohio

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139966)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ADVR, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Anthony Roberts

Co-Investigator:

Tony Roberts

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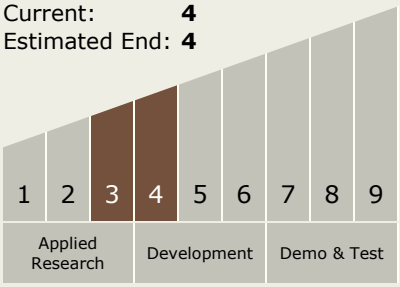
Completed Technology Project (2010 - 2010)

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.1 Detector Development

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System